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Fast machine learning in particle physics

Particle physics studies the nature of elementary particles. There are strong hints that the current theories are not complete yet and that so far undiscovered particles exist. They could be produced in proton collisions at very high energy. To allow significant production of new particles in reasonable time, collisions are performed at 40MHz. Only a small fraction of the data is stored, requiring the use of an online filtering algorithm called trigger. Instead of trigger criteria based on theory predictions, this work focuses on a machine learning based anomaly detection trigger. To fulfill the time constraints and to be compatible with the existing system, the trained model needs to be ported to Field Programmable Gate Arrays.

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Keywords

FPGA
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